I. INTRODUCTION

Who is unemployed among those with doctoral degrees in science and engineering? This question is of interest to those who hold such degrees and those considering a doctorate in science and engineering. This information is also important to policy makers and administrators in the government, members of academia, and other individuals who are responsible for designing, implementing, and monitoring advanced education and career programs.

To provide relevant information, data from the 1993 Survey of Doctorate Recipients (SDR) for individuals under the age of 76 with doctoral degrees in science and engineering from U.S. universities were analyzed. These 1993 results were also compared with data reported for 1973 in two National Academy of Sciences reports, *Employment Status of Ph.D. Scientists and Engineers 1973 and 1975* and *Doctoral Scientists and Engineers in the United States, 1973 Profile.*

LIMITATIONS OF THIS STUDY

Three important limitations of this study need to be highlighted:

- Unemployment represents only a single possible outcome of career decisions. For employed individuals, a variety of job characteristics are of interest—for example, the nature of the work to be done, the work setting, the time demands, and the salary, prestige, and challenge of the position. A doctorate in science and engineering is not pursued simply to avoid unemployment but to obtain certain types of employment. Thus, a study of the factors affecting unemployment is only one of a series of studies of interest to individuals with doctoral degrees in science and engineering and those considering such degrees.

- This study focuses on individuals under the age of 76 with doctoral degrees in science and engineering from U.S. institutions.[2] Individuals not in the labor force (those neither working, seeking work, nor on lay-off) are excluded from this analysis.[3] This narrow focus permits an understanding of a population likely to differ significantly from the general population and from other subgroups within the science and engineering population.

- The multivariate approach used in this report is, at best, an imperfect substitute for a carefully controlled experiment.[4] Determining that an association exists between unemployment and a particular variable does not prove that the variable caused the unemployment. Alternate explanations are that unemployment caused the variable (for example, unemployment may lead an individual to seek additional training) or that unemployment and the variable of interest are both caused by other factor(s) associated with both the variable and unemployment (for example, unemployment rate differences between two race/ethnic groups may be explained by age differences between the groups). Caution, therefore, must be exercised in interpreting the data.[5]

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[2] See the Technical Notes for additional information on the survey.

[3] Limiting the population of interest to those who are in the labor force is consistent with the standard Federal definition of unemployment used by the Bureau of Labor Statistics.

[4] See Technical Notes for a more detailed discussion of the methodology used in this report.

[5] See Marini and Singer for a more detailed discussion of the relationship between statistical association and causality.